Categoricalism, Dispositionalism, and the Epistemology of Properties

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Abstract: Notoriously, the dispositional view of natural properties is thought to face a number of regress problems, one of which points to an epistemological worry. In this paper, I argue that the rival categorical view is also susceptible the same kind of regress problem. This problem can be overcome, most plausibly, with the development of a structuralist epistemology. After identifying problems faced by alternative solutions, I sketch the main features of this structuralist epistemological approach, referring to graph-theoretic modelling in the process. Given that both the categoricalists and dispositionalists are under pressure to adopt this same epistemological approach in light of the regress problem, this suggests that the categoricalist versus dispositionalist debate is best fought on metaphysical rather than epistemological grounds.

1. Introduction: the categoricalism versus dispositionalism debate

Categoricalism is, roughly, the view that the nature of a property is not exhausted by the nomic role(s) it plays. Rather, properties have a primitive, self-contained essence: they are what are known as *quiddities* (Black 2000). Proponents of this view include Armstrong (1983) and Lewis (2009). The opposing view is dispositionalism (or what is sometimes known as causal structuralism or the 'powers' view). On this view, the nature of a property is exhausted by its nomic dispositional role(s): properties are nothing more than dispositions. Proponents of this view include Bird (2007), Mumford (2004) and Shoemaker (1980).

Those familiar with the dispositionalism versus categoricalism debate will know that dispositionalism is often criticised on the basis that it faces a variety of regress problems, one of which points to an epistemological worry. The worry is, roughly, that in order to be able to differentiate any disposition, we need to know which causal manifestation(s) it is a disposition for. But because, in a dispositional world, the manifestation property will itself be dispositional in nature,

it can only be discriminated in terms of *its* manifestation and so on, meaning that the epistemic buck is continually passed (see for example Swinburne 1980, pp. 316-19). In contrast, no such regress problems have typically been raised for categoricalism. Epistemological objections to categoricalism have, instead, focused mainly on certain 'quiddistic' sceptical scenarios. In this paper I argue, however, that categoricalism faces an epistemological regress problem which is precisely analogous to that facing dispositionalism. Moreover, this problem is one that persists even once the aforementioned sceptical problem has been assuaged. The regress in question is revealed as soon as we ask the question of how, on the categoricalist picture, the various nomic roles played by properties in our world can be differentiated. I call this the *nomic regress problem*. After outlining the nomic regress problem, I argue in section three that certain ways of attempting to terminate the regress are not wholly satisfactory. Fortunately, though, there is a more promising structuralist epistemology that may be pursued. After outlining the structuralist epistemological approach in section four, I identify in section five a residual epistemological worry that persists whichever solution to the regress is adopted.

Before proceeding, it is should be emphasized that my concerns in this paper do not touch upon the *metaphysical* merits and problems of dispositionalism and categoricalism. While I argue that dispositionalism and categoricalism are likely to be on a par where epistemology is concerned, that is not to say that the debate will not be settled on metaphysical grounds. For example, it is often argued that the regressive nature of dispositionalism is metaphysically problematic in a way that categoricalism is not. The version of the metaphysical regress problem that Bird (2007, p. 523) thinks is the most serious for dispositionalism concerns the determinacy of a disposition's identity. Critics have worried that because, according to dispositionalism, the identity of each and every property is fixed by its relations to further properties, when we come to pinning down the identity of a property, we either set off on an infinite regress of relations or come back around in a circle to the property in question (see Lowe 2006, p. 138 for example). Others have also worried that if properties are nothing more than dispositions, and dispositions are wholly characterized by their relations to further dispositions (which are in turn are characterized by relations to further dispositions, and so on), then it is difficult to see how reality could be substantial enough to give rise to the world we inhabit. In

Heil's words, '[T]he result is a holism empty of content' (2003, p. 108). One way of fleshing out this worry is suggested in a discussion by Jacobs (2011). If substances are bundles of properties on the dispositional picture, and those properties are constituted relationally, then we are left with a wholly relational view of the world, which Jacobs finds very implausible (2011, §2). On the other hand, if a substance-attribute view of particulars is accepted, particulars will be robbed of any intrinsic, monadic properties (Jacobs 2011, §2). In response, Jacobs argues that properties should not be construed as purely dispositional (2011, §3). I suspect that Jacobs is right about this, but since our concerns in this paper are epistemological, we must set these metaphysical issues aside for another occasion.

2. Premilinaries: previous discussions of categoricalism and epistemology

Epistemological anxieties with respect to categoricalism have already been raised in recent literature. However, these discussions have tended to focus on certain 'quiddistic' sceptical worries (see for example Black (2000), Langton (2004), Lewis (2009), Schaffer (2005), Shoemaker (1980)). Given that there is more to a property than its nomic role(s) on the categoricalist picture, it seems coherent to suppose there is a possible world *w* with the same nomic structure and same properties as ours, but in which the properties take different places within that structure in *w* (see Black 2000). Putting the point in a more regimented fashion, Lewis considers the Ramsey sentence that will fall out of our final scientific theory about which properties play which roles (2009, p. 206). To formulate a Ramsey sentence, we conjoin all of the law statements expressed in our final scientific theory, and replace all of the property names with variables. Then, we prefix each variable with the existential quantifier, leaving us with a summary of the world's fundamental nomic structure. Quiddistic scepticism, Lewis says, is generated by the fact that, on his view, Ramsey sentences are *multiply realizable* (2009, p. 207). That is, because properties are distinct from their roles on his view, the same Ramsey sentence could be true of our world and possible world *w*, but with the nomic roles being filled by different properties in *w*.[1] But this means there is no way for us to discriminate between our world and world *w*. Plausibly, we can only become acquainted with properties by causally interacting with them, i.e., by observing their causal nomic roles, and given that our world and *w* have the same nomic structure,

they will appear the same from our epistemic perspective. On Lewis's view, then, there are facts about the underlying natures of the nomic role occupiers, i.e., the natural properties, of which we are 'irremediably ignorant' (Lewis 2009, p. 214).

There are, however, ways in which a categoricalist might attempt to assuage this worry. Note, first, that the multiple realizability of the Ramsey sentence is not an automatic consequence of categoricalism. This problem only arises if it is accepted that properties occupy nomic roles *contingently*. An alternative option would be to allow that although properties have a categorical aspect to them, they have their nomic roles essentially rather than contingently. Hawthorne calls this the 'dual aspect' view (2006, p. 212; see also Tugby 2012). Alternatively, those who are sceptical about essences could hold that the nomic relations between categorical properties hold as a matter of brute *external* necessity (see for example Fales (1993)). By external, we mean that those relations do not flow from the intrinsic natures of the relata. (An internal relation, in contrast, is typically thought of in this context as a relation which is entailed by the intrinsic natures of the relata[2]). A consequence of either of these views is that properties play the same nomic roles in all possible worlds. If one took this view, the assumption which leads to global quiddistic scepticism – that properties could swap nomic roles in other possible worlds – would be blocked.

But what is the state of play for neo-Humeans, like Lewis, who hold that properties have their roles contingently? Shaffer (2005, p. 20) argues that the quiddistic scepticism which falls out of the multiple realizability of Ramsey sentences is really just a version of external-world scepticism restricted to properties. And philosophers do not lose much sleep over external-world scepticism, even though most would accept the metaphysical possibility of sceptical scenarios. A number of strategies have been developed to blunt the force of external-world scepticism, and these strategies are ones which categoricalists could employ to soften quiddistic scepticism, argues Schaffer (2005, pp. 20-4). Indeed, Lewis (1996) himself has one such strategy in his armoury, namely contextualism (see Langton 2004, pp. 133-5, who explores this strategy in the context of quidditism).

What *would* be a worry for most quidditists, including Lewisian quidditists, is if quidditism did not allow for determinate reference where property terms are concerned. But according to Lewis,

determinate reference is perfectly possible on his view providing the Ramsey sentence is *uniquely* realized in our world (2009, p. 107). This would allow our property terms to hook onto the quiddities via uniquely satisfied definite descriptions concerning their roles. Even if we do not grasp the essence of the properties they refer to, this does not undermine Lewis's commitment to metaphysical realism provided we know *that* our property terms refer. Moreover, as Hawthorne argues, we seem to be in a similar situation with other terms as well. Our ability to refer to Saul Kripke does not consist in an ability to take a 'cognitive photo of his haecceity' (Hawthorne 2006, p. 218). Rather, this ability typically exploits the features Kripke happens to have, for example the relationships he stands in.

In short, then, there are two main responses to quiddistic scepticism. The first is to reject the multiple realizability of Ramsey sentences by holding a view on which properties and their nomic roles are not contingently related. The second categoricalist view accepts that properties have their roles contingently, but holds that this does not matter as long as the nomic structure is uniquely realized. Although we may not know w*hich* properties our terms refer to, this is something we can live with, just as we can live with the metaphysical possibility of Cartesian sceptical scenarios.

My own view is that out of these two options, the first is preferable. I will not argue for this here, however. The point I want to make in this paper is that *whichever of these two strategies one uses to blunt the force of quiddistic scepticism, an epistemological regress problem remains*, one which is precisely analogous to that facing dispositionalism. It is to this problem that we now turn.

3. A more serious epistemic challenge

3.1 The nomic regress problem

It seems, then, that the typical epistemological worry raised against categoricalism is not too damaging. And we have also seen the kind of picture categoricalists present with respect to what it is that scientific theories, at least in part, must achieve: namely, to tell us enough about the laws so that Ramsey sentences can in principle be formulated. Our theories can then identify quiddities such as, say, charge, as those properties which, in our world, play *such-and-such roles*. So far, so good.

But let us now take a step back. How, in principle, could the various nomic roles within a world ever be differentiated in the first place, if categoricalism is true? To answer this question, we must consider how the nomic role of a natural property, call it F, could be distinguished.

Now, a property's nomic role is determined by the natural laws which that property enters into. Laws, in turn, serve to relate certain properties to others. In order to pin down the nomic role of some property F, we must therefore determine which other property (call it G), or properties, F is nomically related *to*.[3] In the case of causal laws, this involves asking which property F is disposed to cause (or, to speak less loosely, this involves asking what causal changes *particulars* instantiating F are able to bring about, in virtue of having that property).

But here is where the regress I warned of earlier begins to bite. If categoricalism is true, then it will not be very illuminating to learn that F's role is such that F is related to property G. This will only allow us to discriminate F's nomic role from other roles if property G can itself be discriminated from other properties. But of course, since property G is nothing more than an ineffable quiddity, there will be no immediate way of discriminating property G from any other property. We are therefore no closer to being able to differentiate F's nomic role. So what can we do at this point? Well, insofar as we can attempt to identify property G at all, we can only do so by asking further questions about which distinctive nomic roles *it* plays, as compared with others. And in order to discriminate the nomic role of G from other nomic roles, we must of course find out what it is that G is nomically related to. But again, the property (or properties) to which G is nomically related, call it H, will be nothing more than a quiddity, which in itself cannot be discriminated from any other. But unless H can be discriminated from other properties, the nomic role of G cannot be distinguished from other nomic roles. At this point, then, we have no choice but to try to discriminate H in terms of its distinctive role(s), and so on. Either an infinite regress threatens or, if the number of properties is finite, we are left with a circle of nomic roles which brings us back to where we started.

Before considering potential ways of terminating this regress, a quick clarification about the nature of the regress worry is needed, so that potential confusion is avoided. The worry here is not that the *definitions* of properties will be viciously circular. As Shoemaker has for example shown, Ramsey

sentences can be employed to yield functional definitions of properties which get around the circular definition worry (see Shoemaker 1981 for further details). The worry here is, rather, how the nomic roles of properties can be *recognised* and differentiated from others on the categoricalist picture, something which it is clearly important for the scientist to be able to do. These are distinct issues: It is clearly one thing to give an analysis or definition of a concept, but yet another to show how the things picked out by those concepts can be recognised. For example, one might define the good in terms of that which brings about the most happiness, but knowing how to discriminate the things which bring about the most happiness is a further matter.

Now that the main features of the regress worry have been outlined, we will in the following subsections consider three ways in which one might try to terminate the regress. I will suggest, however, that none of these approaches are entirely satisfactory. In section four I will outline an alternative which I take to be a more promising way of viewing the epistemology of properties.

3.2 The locational property solution

One way of terminating this nomic regress would be to differentiate G in terms of roles that are not nomic. For example, in a discussion of how unsatisfactory symmetries can be avoided in our final scientific theory, Lewis says that properties may be said to have *locational roles* (2009, p. 207) as well as nomic roles. The locations of properties are, it seems, independent of their nomic roles, and so if, say, property G could be differentiated in terms of its locational role(s), thereby terminating the regress, we could then complete our task of differentiating the nomic role of F. We could differentiate it as the role that relates F nomically to the property (G) *which plays such-and-such locational roles*.

The locational solution is admirably simple, but unfortunately it is difficult to see how it could work in the case of the nomic regress. It is indeed the case that, *metaphysically*, locational roles are independent of nomic roles. But as Ellis (2012, p. 21) and others have pointed out, it is not the case that the locations of entities can be ascertained, *epistemically,* independently of the exercise of causal powers (i.e., nomic roles). But this is precisely what the solution requires, given that the regress is an epistemological one concerning nomic roles. The problem is that we can no more directly ascertain

the various locations of quiddities as we can the very existence of those quiddities. *In either case we need first to be acquainted with the nomic role(s) of the relevant properties*. To illustrate, let us assume that property G belongs to an electric field of a certain kind. How could a physicist ascertain all of the locations of this kind of field? Well, to ascertain the presence of a field at any given location, the physicist would have to test whether an effect characteristic of that field (in response to a certain stimulus) occurs. But knowing which test(s) to implement precisely requires further knowledge of the field's nomic role. And if this further knowledge of G's nomic role is required, then we have not terminated the regress at all. For in ascertaining G's nomic role, we are again faced with the same challenge we faced in our initial task of differentiating the nomic role of F.

3.3 The 'pure quiddity' solution

Another way the regress or circularity would be terminated would be if there was a property in the sequence which, although it could be instantiated as an effect of something else, would not itself have any effects. Such a property would not have, in other words, any forward-looking nomic roles. A property of this sort would allow the regress or circle of nomic differentiation to terminate, because we would arrive at a point at which there were no more nomic roles to discriminate. This scenario is perfectly possible on some versions of categoricalism. If properties play their roles contingently, for example, there seems no reason why a property might not have any forward-looking roles at all.

Is this response to the nomic regress worry a good one? I do not think so. Even if we were in a world in which the regress is terminated in this way, we would arguably be in a world in which we are in an even worse epistemic predicament. In the first instance, since such a world would contain a 'pure' quiddity (i.e., one which has no forward-looking roles), it seems it would be a world with features which are beyond the grasp of the scientist. Having no causal power, this pure quiddity would not affect the scientist or her instruments in any way, and so would be an entity that is forever hidden. But worse is yet to come. The imperceptibility of this pure quiddity would have a knock-on effect with respect to our nomic discrimination of the other quiddities. Let us imagine that our world contained three properties: F, G and H. Suppose that F plays the role of bringing instances of G into

the world, G plays the role of bringing instances of H into the world, but that H has no forward-looking nomic roles whatsoever. Because H is a pure quiddity, the sequence of nomic roles is indeed terminated. The problem is, however, that if H would forever remain hidden (for reasons described a moment ago), it is hard to see how the nomic roles of F and G could themselves be identified. For if the nomic role of G is to bring about instances of H, and H is hidden from us, we would not be able to recognise that G instances have a causal impact. From our perspective, G would itself appear to have no causal power, since the effects it would bring about (i.e., H instances), would be imperceptible to us. This means, therefore, that we would be blind to the presence of G instances, just as we would be blind to the presence of H instances. But this would clearly have yet another knock-on effect where our recognition of F is concerned. If we were blind to the presence of G, and the nomic role of F is to cause instances of G, then we would be blind to the effects that F has also. In short, introducing pure quiddities as a way of terminating the regress appears to create an epistemological disaster.

Now, in response, it may be correctly pointed out that this worry only succeeds if a certain view of perception is assumed. The claim that we would be blind to the existence of pure quiddities rests on the thought that we can only perceive things via their causal effects on us (or our instruments). But if we reject views of perception which always require causal relations with the entities perceived, and accept that, say, we are acquainted with a certain class of properties in a more immediate way, then perhaps quiddities could be directly discriminated, thereby terminating our regress in a more satisfactory way. Indeed, this would solve problem regardless of whether some quiddities are pure. With this in mind, then, let us consider in the next subsection whether the categoricalists could solve the regress problem by accepting this 'direct acquaintance' approach. Unfortunately, we will see that although this solution is more promising than those just considered, such a position nonetheless brings its own challenges.

3.4 The 'direct acquaintance' solution

The 'direct acquaintance' solution relies on the claim that although most categorical properties can only be discriminated via their causal roles, there is a special class of properties which we can

discriminate directly. Such direct discriminations would allow the epistemological buck-passing to terminate.[4] Such a strategy would, incidentally, serve also to weaken the general quiddistic scepticism discussed earlier, for while it would still be true that we are irremediably ignorant about the true natures of most properties, there would nevertheless be a select group of properties into whose essence we could gain direct insight. For this reason, Lewis (2009, p. 217) himself discusses this kind of view in his paper on quiddistic scepticism (see also Locke 2009, §6.2). The most plausible candidates for these 'directly accessible' properties, he says, would be mental phenomenal properties, or 'qualia'. As Dennett remarks, qualia have traditionally been thought to have four defining features: they are 'properties of a subject's mental states which are 1) ineffable, 2. intrinsic, 3. private, and 4. directly or immediately apprehensible in consciousness' (1998, p. 43, 47). As qualia have the special epistemic status of being graspable in an unmediated way, they seem precisely the kinds of properties which could allow the nomic regress to be halted, provided they are genuine worldly properties.

Is this an attractive route? As mentioned already, I take it to be the most promising route considered thus far, but unfortunately it faces two major problems. The first is simply that, according to eliminativists like Dennett, there are no good reasons for supposing that qualia exist. To use a distinction drawn by Block, Dennett (1991) does away with the notion of *phenomenal* consciousness, and attempts to account for our mental lives only in terms of what Block calls *access* consciousness (1995, p. 238). Access consciousness, unlike phenomenal consciousness, does not involve special access to qualia, and concerns only the state of being poised to utilise perceptual information in rational processes guiding speech and action. Since such processes can be characterised purely in terms of causal/functional and intentional relations, this view of consciousness has no need to bring relations of direct apprehension into the story. Perhaps we can call phenomenal information 'qualia' if we like, but they are not private and immediately apprehensible in the way outlined above. We need not go into the details of these arguments here, however. The first point to highlight is just that the existence of directly accessible qualia is a matter of dispute.

The second relevant point, which we will now address, is that even if directly accessible qualia are accepted, it remains a matter of dispute as to whether qualia and in particular non-causal relations of

direct acquaintance can be accommodated within thoroughly physicalist frameworks—frameworks which most categoricalists will want to accept.[5] Levine (2007; see also Schroer 2012) introduces the worry in a discussion of the explanatory gap problem concerning physicalist accounts of phenomenal properties. Ironically, many physicalists have appealed to relations of direct awareness (or what Levine calls relations of 'acquaintance' (2007: 158)) in order to assuage this explanatory gap worry. But according to Levine, this serves only to delay the problem, as it is difficult to see how relations of acquaintance can themselves be understood as anything other than non-physical cognitive relations. In order to appreciate the worry, it will be helpful to briefly rehearse Levine's discussion here.

The explanatory gap problem is essentially that of explaining how it is that qualia can be understood as physical properties, as physicalism requires. Notoriously, for example, Jackson's case of Mary (1982) suggests that no matter how much knowledge of physics one has, such knowledge will not capture the essence of phenomenal properties. Facts about what it is like to, say, experience redness, appear not to be derivable from the physical facts, which presents a prima facie reason for thinking that physical properties and phenomenal properties are distinct.

Now, while many physicalists accept that there is this explanatory gap, they argue that such a gap is to be expected, despite phenomenal properties being identical with physical properties. In other words, they attempt to explain away the explanatory gap problem. The reason the explanatory gap exists, they argue, is not that phenomenal states are non-physical, but rather because of the differences between the modes of presentation involved in our physical concepts and our phenomenal concepts (Levine 2007, p. 149). Although phenomenal concepts refer to the same properties as certain of our physical concepts (namely, physical properties), those concepts access those properties in very different ways. It is precisely at this point that the aforementioned relations of acquaintance, which bring cognitive immediacy, are appealed to. While nonphenomenal concepts are said to pick out their referents via our causal relations with them, phenomenal concepts present their objects in a more direct, introspective (non-causal) manner.

How precisely, though, are these direct relations of acquaintance to be understood? The classical view of Loar (1990) is that phenomenal concepts are recognitional concepts, which involves the idea

that the referents of phenomenal concepts (i.e., the phenomenal properties) serve as their own (non-contingent) mode of presentation. They are, in other words, self-representing, which is why we directly recognise the states in question. According to Perry's version (2001), the direct nature of phenomenal awareness arises from the fact that phenomenal concepts function in the same way as demonstratives and indexicals. Thus understood, it is not surprising that theories couched in purely causal terms miss out certain aspects of our perceptual lives, given that our physical theories typically do not involve indexicals (Perry 1977). Unfortunately, we cannot go into the details of these variants here, but this is not essential, because all that matters for our purposes is that these views have something important in common. As with the recognitional view, in order for phenomenal concepts to function in the same way as indexicals and demonstratives, an instance of the property picked out must be incorporated in some way into the phenomenal concept itself, by serving as its own mode of presentation. In contrast, as nonphenomenal concepts present their referents via causal intermediaries (often with the help of scientific instruments), our access to those referents is less direct.

In short, then, on these views our access to phenomenal properties is distinctive in that the phenomenal property itself is present in our representation of it. At this point, though, it is important to remember that this story is supposed to be compatible with physicalism, or what Levine calls the 'materialist constraint' (2007, p. 150). That is, the representation in question must be something that is *physically* implemented, and this means that talk of phenomenal states being 'present' in their representation can only be a *physical* presence. But Levine argues that this constraint serves only to give rise to a further explanatory problem: 'how does the presence of the relevant state within the physical implementation of the representation become something of which we are aware?' (2007, p. 163). The worry here is that there remains a mystery how the physical presence of phenomenal properties (in, say, a person's brain) should give rise to a *cognitive* presence. It seems facts about cognitive presence could not be derivable from facts about physical presence, and we cannot appeal to any further causal facts to do the explaining, because the whole point of appealing to phenomenal representation as a special kind of awareness is that such awareness is not causally mediated. At

present, then, Levine thinks it is difficult to see what a physical explanation of cognitive acquaintance could look like, suggesting that relations of acquaintance are fundamental non-physical relations.

How conclusive is this argument? Well, as Levine himself concedes in one place, explanatory gap problems are 'not quite enough to deal materialism a death blow' (2001, p. 86). New explanations may be forthcoming which can close the gap. Moreover, some physicalists would argue that there is not really a mystery here to be solved. For example, Papineau holds a theory akin to the indexicality theory outlined above, according to which phenomenal concepts represent their referents as *the experience: "---"*, with the blank being filled by the phenomenal experience being felt at the time the concept is employed (2002, §4.8 and 2007). Importantly, Papineau explicitly rejects the idea that this phenomenon involves anything like the relations of acquaintance which Levine speaks of (e.g. Papineau 2002, p, 56, fn. 7). The question is, then, whether we can sustain the idea that phenomenal experiences present themselves in a special way without thinking of those experiences as having a distinctive *cognitive* presence. Unsurprisingly, Levine thinks we cannot, and suggests that when Papineau speaks of the distinctive 'feels' which attend phenomenal concepts, as opposed to nonphenomenal ones, there must be something like the notion of acquaintance in play:

> ... for the presence of the experience when exercising a phenomenal concept to make a difference, "feeling" it must itself carry with it awareness; it must itself rise to the level of cognitive significance. But this is precisely what we don't know how to implement in a purely physical system. (2011, p. 164, fn 10).

We cannot, of course, hope to settle such a large dispute here. But what seems clear, and what is important for the purposes of this paper, is that it is a matter of ongoing dispute whether views which posit a special kind of phenomenal awareness can be accommodated within thoroughly physicalist frameworks. And as we saw earlier, aside from that, the very existence of directly accessible phenomenal qualia is itself a matter of dispute. For these reasons, it would be nice to have a solution to the regress problem which is not hostage to the fortunes of these controversial debates in the philosophy of mind. Fortunately, there is such a solution, one which we will now explore.

4. Responding to the nomic regress: a structuralist epistemology

Assuming there is a finite number of natural properties, the nomic regress problem points to circularity rather than an infinite regress. Not all circularities (or regresses) are vicious, however. Some philosophical definitions are circular, for example, but that does not mean we cannot learn from them. Might it be, then, that in undergoing a circular sequence of role-differentiation steps, we are able to learn something which does, after all, allow us to differentiate the various nomic roles?

Well, one thing that would be achieved is that we would have explored the *overall nomic structure* of the world. Having learned about the structure of the nomic web, cannot we then simply differentiate each nomic role from others, *in terms of their relative positions within the wider nomic structure?* Such a strategy would, in short, involve accepting a *structuralist* epistemology. Indeed, this is precisely the kind of epistemology that the rival dispositionalists must, most obviously, accept. This is because dispositionalism presents, as we saw, a structuralist metaphysical view about properties, since on that view the nature of any property is exhausted by its directedness towards other properties. Thus, the obvious (and only) way of differentiating dispositions, on that view, is to find out how they all stand to each other in terms of the overall dispositional structure of the world. The parallel categoricalist move, which is equally available to those who hold the dual aspect or Lewisian view outlined earlier, is to say that nomic roles can be differentiated in terms of their relative positions in the overall nomic structure.

Indeed, work has already been done by the dispositionalists to show that properties can be discriminated perfectly well using only their structural features, and I suggest these are insights that the categoricalists can utilise. Bird (2007), for example, has illustrated the point using the resources of graph-theory. These graphs involve nodes (or 'vertices') which are connected via directed arcs, with the nodes representing the properties, and the arcs representing the nomic relations between those properties. These relations have a direction because, as Bird points out (2007, p. 139), nomic relations (or what he calls 'manifestation' relations) are typically asymmetric. For example, while a manifestation of a particle's charge is acceleration, charge is not a manifestation of acceleration. Note

also that in structuralist graphs the nodes are not labeled, which indicates that they are to be differentiated in terms of their relational place within the overall graph.

Now, such graphs may be understood as representing what a world may be like in terms of the nomic structure that obtains. And once the structure is clearly mapped out in this way, it is not difficult to see how the nodes in the graph can be distinguished from all others. As long as the world-graph is asymmetric, then the properties are '…fully determined by the asymmetric pattern of those structures' (Bird 2007, p. 146). That is, if each property has unique relational features (in virtue of asymmetry), each property will be distinguishable from every other. An asymmetric graph is, more precisely, one that is not susceptible to any non-trivial automorphisms: it cannot be rotated in a way which preserves the image while leaving the nodes in different positions. A simple example of such a graph is Figure 1., which represents a five-property structure:

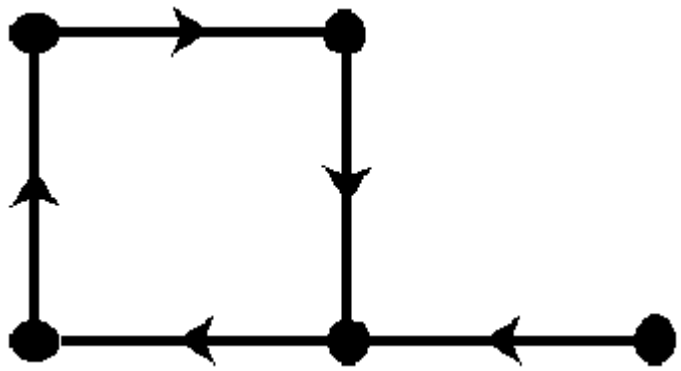

Figure 1. Example of an Asymmetric Graph

There are, of course, many details which need be added to the epistemological story. For example, we cannot simply identify the whole nomic structure at once: science is piecemeal, and involves piecing together the relationships between properties gradually. And this raises interesting questions concerning our points of entry into the structure. This is not the place to address such big questions in the detail they deserve. But what seems clear is that in building the world graph we cannot but start with the properties of those macro-objects which are able to have direct effects on our perceptual faculties, or with properties whose effects on other objects can be easily observed. After identifying the macro-properties via these effects, we then build outwards from there. Once we gain enough knowledge about the causal roles that macro-properties play, we are then able to build instruments

which allow us to access the deeper levels of nature. The more we build outwards from our starting point in the graph, the more theoretical and fundamental the properties become.

This distinction between what appear to be 'higher-level' macro-properties and the 'lower-level' theoretical properties which, say, figure in our fundamental physical theories, raises the possibility of thinking of reality as having different, but equally objective, *levels* of properties. Although I cannot hope to settle such a large question here, it will be helpful to offer some speculations about how the aforementioned graphs could be interpreted by those holding different views on the levels issue. With this in mind I will briefly consider three common stances: what I will call the 'levels' conception, Heil's 'modest realist' conception and physical reductionism.

According to the levels conception, it is indeed thought that 'higher-level' predicates pick out unique properties which, while intimately connected with lower-level properties, are distinct from them. Heil discusses Searle's view, for example, on which a higher-level property such as a thing's solidity is viewed as a distinct property in its own right, though one that is 'causally supervenient' on the lower-level vibratory movements of the thing's constituent molecules (Searle 1992, p. 119, 125). If Searle's picture is correct, then in order for our graphs to reflect reality, these higher-level properties would have to be distinguished in some way in our graphs. One way of doing this would be to have two different kinds of arc: one representing Searle's 'inter-level' causal supervenience relations, and one representing the 'horizontal' nomic relations holding between properties which are at the same level. One way of doing this would be to use lines of different hatching for the different kinds of arc.

In contrast, Heil finds the levels picture problematic. While he agrees that 'higher-level' predicates pick out objective similarities and differences in nature, he argues that such predicates do not pick out *unique* properties. Rather, things which fall under the extension of a higher-level predicate do so in virtue of being similar, though *less-than-perfectly-similar*, in ways which are salient to us (Heil 2003, Ch. 5). Using the example of fragility, for example, Heil remarks that when we consider the diversity of the things which can all be said to be fragile, it becomes implausible to think that those things all share a single property in virtue of which they are fragile (2003, p. 29). Rather, fragile things share

properties which are physically similar, though not perfectly similar. Note, though, that this is not a reductionist position: these patterns of less-than-perfect similarities are fully objective and also projectable, given that objects with less-than-perfectly similar properties behave in less-than perfectly similar ways (2003, p.41). Nonetheless, these patterns of less-than-perfect similarity are not the kinds of patterns that we expect fundamental physics to identify. Returning to our graphs, then, this picture suggests it is important to distinguish not between inter-level and intra-level relations, but rather between nodes representing less-than-perfect similarities and nodes representing the perfect similarities in nature. One way of marking this distinction would be to use nodes of different colour.

Finally, on the physical reductionist picture, 'higher-level' predicates may pick out perfect similarities, but these properties are nothing more than complex combinations of the fundamental physical properties. On this view, nothing would be lost from our theories about the world if higher-level predicates were removed from our language, because statements about higher-level 'properties' and the laws they concern are derivable from statements employing only fundamental predicates (see Nagel 1961 for a well known statement of this model). Ultimately, then, the macroscopic/microscopic distinction (for example) is just a distinction between different ways of talking about the very same things (or in our case, the one true fundamental graph). Putting the point in terms of graphs, higher-level predicates are more course-grained and will refer to complex portions of the graph (i.e., subgraphs) rather than to specific nodes. Of course, as science progresses we will often mistakenly associate what are in fact higher-level predicates with single nodes, precisely because we cannot always be sure which predicates are high-level. We currently think that sub-atomic properties and their corresponding predicates are fundamental, but maybe we will one day change our minds. But as science progresses, any nodes which are really representing something non-fundamental must eventually be replaced by more complex graph structure, until we are left with nodes corresponding only to truly fundamental predicates. On this view, then, our final graph will acknowledge neither a distinction between inter-level and intra-level relations nor distinctions between different kinds of node.

5. The residual problem of symmetry

Now that this graph-based epistemology has been sketched, I want to finish by acknowledging a residual problem which appears to persist whichever solution to the regress problem we accept. In our discussion of graphs a moment ago, we saw how each and every property has a unique position in structures which are *asymmetric*. But on either the dual-aspect version of categoricalism or the Lewisian version, one must presumably accept the possibility, in principle, of properties with distinct categorical essences sharing the same nomic profiles. [6] In such cases, the overall nomic graph of such a world could turn out to be symmetrical. And without knowing for sure that our world is not one of those which instantiates a symmetrical nomic structure, we cannot rule out that when employing the scientific method we sometimes mistakenly identify what are actually distinct properties.[7]

All that can be said at this point is that whichever solution to the regress problem is adopted by the categoricalists, this problem is likely to remain. For example, the advocate of the qualia approach (§3.4 above) is not entitled to claim victory over the structuralist approach in light of the symmetry problem, because that approach is also susceptible to it. Even if the intrinsic natures of phenomenal properties can be directly accessed by us, thereby terminating the nomic regress, we still could not rule out the sceptical thought of there being other distinct non-phenomenal properties which share the same nomic profile. However, this is, I suspect, something we can live with, just as we can live with the possibility of sceptical scenarios in epistemology. As long as our world *is* asymmetric, then our scientific theories will discriminate properties perfectly well. An analogy with externalist responses to Cartesian scepticism is relevant here. For the externalists about knowledge, Cartesian scepticism fails in its aim to show that worldly knowledge is impossible. On externalist views, if we do not live in a deceptive world, then we do indeed have worldly knowledge. Similarly, if our world has an asymmetric nomic structure, then our scientific theories carve the world up perfectly well. And in terms of justification, we might take comfort in Armstrong's claim that we are pragmatically justified in taking it that distinct properties bring distinct causal powers (1978, pp. 43-5). Although I would welcome a stronger response than this, perhaps it is the best we can do.

Finally, how do things stand with dispositionalism? Can the dispositionalists avoid the problem of symmetry? The answer is that it depends. Prima facie, if properties are exhausted by their nomic roles, then one might think there is no question of two distinct properties sharing the same nomic roles. However, Hawthorne takes it that if dispositionalism (or 'causal structuralism') is interpreted in this way, then it becomes an implausible view, given that symmetrical structures appear to be conceivable[8]. Lowe also makes this point forcefully, remarking that '[I]t surely will not do to proclaim as an a priori truth that the power-structure of any possible world *must* exhibit asymmetries ...' (2010, p. 18). In light of this, Hawthorne sets about outlining how dispositionalism, or what he calls 'causal structuralism', can be developed in a way that is compatible with symmetrical structures. Such a view is metaphysically coherent, he argues, if a counterpart theory of properties is combined with a rejection of quidditism. I will not go into details here, but for our purposes it is worth noting that even if this version of dispositionalism is successful metaphysically, the kind of epistemological problem discussed a moment ago remains. That is, it is hard to see how the structurally indiscernible properties could be discriminated by our scientific methods.[9] Hawthorne concedes as much in a footnote: '[W]e normally discriminate properties by their differential impact on our sensory organs or on some detection instrument. But in the [symmetry] case described there is no straightforward basis for such discrimination' (2006, p.224, fn. 31; word in parentheses added for clarity).

6. Summary

Dispositionalism should not be criticised on the grounds that it faces a certain kind of epistemological regress problem, as categoricalists like Swinburne have tried to do. This is because the rival categoricalist view faces precisely the same kind of problem. Thus, in terms of epistemology, categoricalism and dispositionalism are in a similar boat. One of the most promising ways of developing the epistemology of properties, on either of these views, is to adopt a structuralist epistemological picture. After outlining this picture, a residual epistemological worry was identified, one which is likely to persist whichever solution to the regress problem is accepted.

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[1] Lewis expresses this thought in two different ways, by appealing to the *permutation* scenario and the *replacement* scenario. For further details see Lewis (2009).

[2] It is worth noting that the term 'internal relation' is a slippery one, and is used in different ways in different contexts. See for example Barker (2009), who distinguishes between Armstrongian, Leibnizian and Bradleyan internal relations (2009, pp. 246-7). The notion of internality described above is the Leibnizian one.

[3] The following regress objection can be framed without addressing the question of what, precisely, the nomic relation amounts to. Armstrong (1983, Ch. 6), takes the nomic relation to be a *sui generis* relation between properties. Other categoricalists view nomicity in terms of regularity relations: see for e.g. Lewis 1973, p. 73.

[4] This is how Fales, who holds something like a dual aspect view of properties, thinks the epistemology of properties should be tackled (1990, p. 222).

[5] See Lewis for a related worry (2009. p.217). He considers whether the fundamental quiddities could all be construed as qualia as a way of answering the global quidditistic scepticism discussed earlier, but he rejects this proposal on the grounds that qualia clash with his materialist commitments.

[6] In a forthcoming book chapter, Paul draws a similar conclusion (though from a somewhat different angle) with regards to Lewisian metaphysical realism. Paul argues that our scientific terms can have determinate reference on Lewis's system (thereby overcoming Putnam's model-theoretic problem), but that this is contingent on our world having the right kind of (non-symmetrical) structure.

[7] Localised versions of the symmetry problem have also been raised in the philosophy of mind. Those who accept the possibility of inverted qualia, for example, accept that two distinct qualitative experiences could play identical functional roles. In the case of intersubjective qualia inversion (Shoemaker, 1975, p. 197), because the functional roles of people's differing experiences would be the same, the differences in those experiences would be completely undetectable (all the perceivers would still overtly agree on which objects count as having which colour, for example). This suggests, among other things, that purely functional theories of mind miss something out. See Shoemaker (1975) for a functionalist response. Needless to say, it would be nice for the categoricalists if they could find an argument to rule out functional symmetries in all cases, whether they be phenomenal or non-phenomenal ones.

[8] Hawthorne illustrates by asking us to consider the following scenario: 'there are four properties, call them A, B, C, D. Here are the laws governing them: AnC, BnC, (A and B)nD' (2006, p. 224). Here, A and B are

distinct, since their coinstantiation has different effects than is produced by single instantiations of them. Such a structure, Hawthorne claims, is intuitively possible yet is clearly symmetrical.

[9] The same point applies to another structuralist view which would allow for symmetrical structures, one which was first suggested by Shoemaker and which Hawthorne calls ‘modest’ structuralism. For details of this view see Hawthorne 2006, appendix, pp. 226-7.